

Serial No. 10/694,811
Docket No. PTGF-03081
HIR.079

2

AMENDMENTS TO THE CLAIMS:

Please cancel claim 23 without prejudice or disclaimer, and amend the claims as follows:

1. (Previously Presented) A III group nitride system compound semiconductor light emitting element, comprising:

a transparent substrate that comprises a material other than a III group nitride system compound semiconductor;

a convex light trapping member that is formed over a surface of the transparent substrate; and

a III group nitride system compound semiconductor layer that is formed on the surface of the transparent substrate;

wherein the light trapping member has a refractive index substantially equal to a refractive index of the transparent substrate or closer to the refractive index of the transparent substrate than a refractive index of the III group nitride system compound semiconductor layer.

2. (Currently Amended) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein[:] the transparent substrate comprises sapphire, and

wherein the light trapping member comprises at least one of Al_2O_3 , Eu_2O_3 , La_2O_3 , Sm_2O_3 , WO_3 and Y_2O_3 .

3-5. (Canceled)

6. (Currently Amended) A pretreated transparent substrate, comprising:

a transparent substrate that comprises a material other than a III group nitride system compound semiconductor; and

a convex light trapping member that is formed over a surface of the transparent

Serial No. 10/694,811
Docket No. PTGF-03081
HIR.079

3

substrate;

wherein the light trapping member has a refractive index substantially equal to a refractive index of the transparent substrate or closer to the refractive index of the transparent substrate than a refractive index of a III group nitride system compound semiconductor.

7. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein said convex light trapping member is formed directly on the surface of the transparent substrate.

8. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, further comprising:

a buffer layer disposed on the surface of said transparent substrate,

wherein said convex light trapping member is formed on the buffer layer such that the buffer layer is disposed between said convex light trapping member and said transparent substrate.

9. (Currently Amended) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein said convex light trapping member comprises an uneven pattern formed ~~on an entirety of~~ across the surface of the substrate, from a first end of the substrate to a second end of the substrate.

10. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 8, wherein said buffer layer comprises at least one of AlN, GaN, InN, AlGaIn, InGaIn and AlInGaIn.

11. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein said convex light trapping member comprises:

inclined side portions; and

Serial No. 10/694,811
Docket No. PTGF-03081
HIR.079

4

a top portion positioned between said inclined side portions.

12. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein a light component projecting onto a top surface of the convex light trapping member at an incident angle of more than approximately 47 degrees is subjected to total reflection, and

wherein other light components are trapped into the convex light trapping member and the transparent substrate and are discharged outside of the transparent substrate.

13. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein light entering into said convex light trapping member is directly transmitted through said transparent substrate and then discharged outside of said substrate.

14. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein said convex light trapping member is formed independently from said transparent substrate.

15. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein said convex light trapping member comprises a width of $0.1\text{ }\mu\text{m}$ to $10\text{ }\mu\text{m}$, a pitch of $0.2\text{ }\mu\text{m}$ to $20\text{ }\mu\text{m}$ and a height of $0.1\text{ }\mu\text{m}$ to $5\text{ }\mu\text{m}$.

16. (Currently Amended) The pretreated transparent substrate according to claim 6, wherein[:] the transparent substrate comprises sapphire, and

wherein the light trapping member comprises at least one of Al_2O_3 , Eu_2O_3 , La_2O_3 , Sm_2O_3 , WO_3 and Y_2O_3 .

17. (Previously Presented) The pretreated transparent substrate according to claim 6, wherein said convex light trapping member is formed directly on the surface of the transparent

Serial No. 10/694,811
Docket No. PTGF-03081
HIR.079

5

substrate.

18. (Previously Presented) The pretreated transparent substrate according to claim 6, further comprising:

a buffer layer disposed on the surface of said transparent substrate,
wherein said convex light trapping member is formed on the buffer layer such that the buffer layer is disposed between said convex light trapping member and said transparent substrate.

19. (Currently Amended) The pretreated transparent substrate according to claim 6, wherein said convex light trapping member comprises an uneven pattern formed ~~on an entirety of~~ across the surface of the substrate, from a first end of the substrate to a second end of the substrate.

20. (Previously Presented) The pretreated transparent substrate according to claim 6, wherein said convex light trapping member comprises:

inclined side portions; and
a top portion positioned between said inclined side portions.

21. (Previously Presented) The pretreated transparent substrate according to claim 6, wherein a light component projecting onto a top surface of the convex light trapping member at an incident angle of more than approximately 47 degrees is subjected to total reflection, and

wherein other light components are trapped into the convex light trapping member and the transparent substrate and are discharged outside of the transparent substrate.

22. (Previously Presented) A light emitting diode, comprising:

a III group nitride system compound semiconductor light emitting element,
comprising:

Serial No. 10/694,811
Docket No. PTGF-03081
HIR.079

6

a transparent substrate that comprises a material other than a III group nitride system compound semiconductor;

a convex light trapping member that is formed over a surface of the transparent substrate; and

a III group nitride system compound semiconductor layer that is formed on the surface of the transparent substrate,

wherein the light trapping member has a refractive index substantially equal to a refractive index of the transparent substrate or closer to the refractive index of the transparent substrate than a refractive index of the III group nitride system compound semiconductor layer.

23. (Canceled)

24. (Previously Presented) The III group nitride system compound semiconductor light emitting element according to claim 1, wherein light entering into said light emitting member is directly transmitted through the transparent substrate.

25. (Previously Presented) The pretreated transparent substrate according to claim 6, wherein light entering into said light emitting member is directly transmitted through the transparent substrate.

26. (Previously Presented) The light emitting diode according to claim 22, wherein light entering into said light emitting member is directly transmitted through the transparent substrate.